

Kilduffe on "The Status of the Clinical Pathologist," together with the appended discussions.

Experience has taught me that it is not only impossible, but impractical for a medical director of laboratory work to spend the amount of time in clinical work necessary to make him really proficient in things clinical, without being correspondingly neglectful of his duty as pathologist.

The degree of helpful application of any medical man's experience, in whatever branch of medicine he may be practicing, will alone determine the status of that individual.

DOCTOR R. A. KILDUFFE (closing)—The main purpose of the paper was not to present any set or individual viewpoint, but to arouse discussion of a problem meriting attention.

Those familiar with the trend of current discussion of medical education and medical practice cannot fail to appreciate that neither have as yet attained the ideal; nor can it be gainsaid that the fullest clinical utilization of laboratory resources as a part of the clinical study of disease is the exception rather than the rule—whether one considers the recent graduate who, too often, looks upon laboratory examinations as the *sine qua non* of clinical study, or the older practitioner who may either give them an unwarranted significance or more or less disregard them entirely.

Laboratory and clinical medicine are not distinct entities; one is complementary to the other. The clinician must know enough of laboratory medicine, of pathology, to utilize its methods wisely and to the best advantage. The pathologist must be sufficiently a clinician to interpret in terms of the patient the abnormalities he demonstrates in the laboratory.

It is well, indeed, to commend the thoroughness of one's colleague and the integrity of his efforts; but it is better to be eager and able to utilize them to the fullest extent.

If the entrance of the laboratory, as personified by the pathologist, into the wards or the problems of clinical medicine as an active participant in their attempted solutions is to be looked upon as an intrusion, then all that is necessary is a sufficient number of technicians to handle the work. It seems more sensible and more conducive to success in the efforts to solve the clinician's problems to expect and demand of the pathologist that he be something more than a manipulative expert. A clear understanding of the situation demands a preliminary clear and distinct differentiation of the pathologist from the technician.

It must be recognized that clinical pathology is a specialized branch of the practice of medicine, and that it is neither limited to nor comprised in the mechanical and more or less automatic performance of technical manipulations in the form of tests. There is some reason to maintain that in the minds of some, at least, the conception of clinical pathology has been limited to tests of one sort or another, and of the pathologist as the performer of tests.

Ewing summarizes the function of the pathologist as:

"1. To investigate the causes of fatalities . . . to elucidate the causes of disease . . . and to correct partial or erroneous diagnoses.

2. To keep himself familiar with the literature and progress of the medical sciences.

3. To co-operate with the internist in general diagnosis and to serve the surgeon in gross anatomic and physical diagnosis.

4. To serve as a consultant in the wards and the operating-rooms where, by virtue of his special knowledge, he should be able to bring data with which, as a rule, the clinician is less familiar.

5. To supervise the work of the clinical laboratory . . . restraining excessive demands, establishing correct indications for the resort to laboratory tests, and aiding in clinical research."

Doctor, if that addict you prescribe for happens to be a detective, you are in trouble with the law.

If he is not an under-cover agent, but another who really should not have the drug, what about your conscience?

GLUCOSE INTOLERANCE ASSOCIATED WITH ECZEMA

By SAMUEL AYRES JR., M. D., *Los Angeles*

(From the Department of Dermatology, White Memorial Hospital)

A preliminary report is presented, dealing with the glucose tolerance reactions in a series of thirty-six consecutive cases of typical eczema.

The tests were made in two laboratories, each using the Folin-Wu colorimetric technic.

The fasting blood sugar values in these cases of eczema were not found to be abnormally high except in a few cases.

Very striking deviations from normal were found, however, at the one and two-hour periods, following the administration of the test glucose solution. Of the thirty-six eczema cases, 33.3 per cent showed 200 mgs. or more of glucose per 100 cc. of blood at the end of one hour in contrast with only 5.6 per cent of 300 normal controls, and 16.6 per cent of the eczema cases showed 200 mgs. or more at the end of two hours in contrast with only 0.8 per cent of 253 normal controls.

Of the thirty cases which were tested at the end of three hours, 40 per cent had not returned to a conservative estimate of normal (110 mgs.).

Important discussion by Oscar V. Schroeter, Los Angeles; Kendal P. Frost, Los Angeles; Lorena M. Breed, Pasadena; George Piness, Los Angeles; H. P. Jacobson, Los Angeles.

REPEATED attempts to discover the cause of eczema have led gradually to a realization of the fact that there is no one cause. The conception of eczema as a symptom, rather than a disease entity, is helping materially in solving the riddle of its causation. No one regards abdominal pain as a disease; it is merely a symptom of one out of many possible causes. The mechanism by which the pain is produced, namely, stimulation of the visceral or peritoneal receptor nerve-endings, with passage of the impulse to the brain and frequently to the corresponding cutaneous area, is the same in many conditions. Thus, an acutely inflamed appendix, a gallstone, a tabetic crisis, or a green-apple "tummy-ache" may produce the symptom of abdominal pain, although there will be certain variations in its location, intensity, quality, etc. In the same manner, apparently, a number of causative factors, may, through the medium of the cutaneous vaso-motor system, produce the symptom which is commonly recognized as eczema. Sensitization to the proteins of certain foods, pollens, animal emanations, etc., classed together as allergy, constitutes one of the major causes of eczema. Improper utilization of fat, especially in infants, has been claimed also to be causative in a certain proportion of cases of eczema. The substances which may produce an eczematous reaction through local irritation are too numerous to mention. Poison oak, lacquer, dyes, chemical agents of all kinds, are some of the more common examples.

Disturbances in carbohydrate metabolism have long been recognized in a half-hearted way as being responsible for, or at least associated with, eczema in a few instances. Practically none of the textbooks on general medicine, even in the chapters on carbohydrate metabolism, make any especial mention of eczema as a possible manifestation of a dis-

turbed carbohydrate metabolism, and the current texts on dermatology are equally silent on this point.

The first scientific work of any importance establishing a relationship between eczema and disturbed carbohydrate metabolism was the recent report by McGlasson on the fasting blood sugar in a series of 158 cases of assorted dermatoses, mostly of an eczematous type. Of the entire series of 158 cases, 139 cases, or 87.9 per cent, gave fasting values of 120 mgs. of sugar or more per 100 cc. of blood. Between 90 and 100 mgs. would probably be considered an average normal reading. McGlasson groups his cases according to the clinical appearance at the time of examination. Thus, of the group of 44 cases of seborrheic dermatitis, 77.3 per cent gave readings of 120 mgs. or more; in the flexural dermatitis group, comprising 32 cases, 90.6 per cent were at 120 or above; in the "toxic rash" group of 39 cases, 87.2 per cent showed values of 120 or above, and in the group of 22 cases showing vesicular eruption of the hands, feet, and crotch, 77.2 per cent were above 120 mgs.

All of McGlasson's sugar determinations were made in one laboratory, using the Gradwohl gravimetric method in the majority of the cases, although Gradwohl's modification of the Lewis-Benedict colorimetric method was used in many of the cases. Both methods were used simultaneously in ninety tests with very close agreement between the two methods, the average for the gravimetric being 133.4 mgs. against 135.2 mgs. for the colorimetric method. McGlasson found that many of these cases improved rapidly on a low carbohydrate diet even when no local treatment was applied.

The present study was undertaken in order to examine in more detail the nature of the carbohydrate metabolism in typical eczema. The exact definition of what constitutes "typical eczema" is rather difficult, since an eczematous eruption, if untreated, may pass through a number of phases, sometimes as many as six or seven. Thus, there may be at first simple erythema; later, edema; then vesiculation, exudation, crusting, and, if the inflammation subsides, desquamation; or if the inflammation continues in a subacute form, thickening or lichenification. The alterations brought about by treatment proper or improper, and by occasional pus infection, still further complicate the picture. It does not seem possible that any one phase can be singled out as typical eczema in contrast to the other phases as atypical. Nor does it seem rational to classify too sharply cases of eczema according to the stage in which they are seen. Possibly a month or a year later they may be in entirely different stages.

With these facts in mind it will be seen that erythematous, vesicular, oozing, or lichenified types are included in this series as representing cases of typical eczema, but cases frankly not eczema, such as erythema multiforme, seborrheic dermatitis, or dermatitis herpetiformis, are not included. The tests were made routinely on both private and clinic patients whenever they could be persuaded to submit, and aside from the above restrictions no attempt was made to select the cases. On the other hand, every effort was used to make this series one of consecutive cases, so that the results would definitely

indicate the extent to which disturbed carbohydrate metabolism was associated with eczema.

The glucose tolerance reactions were tested in thirty-six consecutive cases of typical eczema. The cases were distributed between two laboratories, the laboratory of Drs. Brem, Zeiler and Hammack, and the Metabolic Research Clinic of the White Memorial Hospital, each using blood obtained by vein puncture, and each employing the Folin-Wu colorimetric technic. The test meal consisted of 1.75 gm. glucose per kilo of body weight in 300 cc. water, administered in the morning fourteen hours after the last meal; in a very few cases the test meal consisted of 100 gms. of glucose, without regard to the weight. The analyses of the two laboratories showed a general agreement.

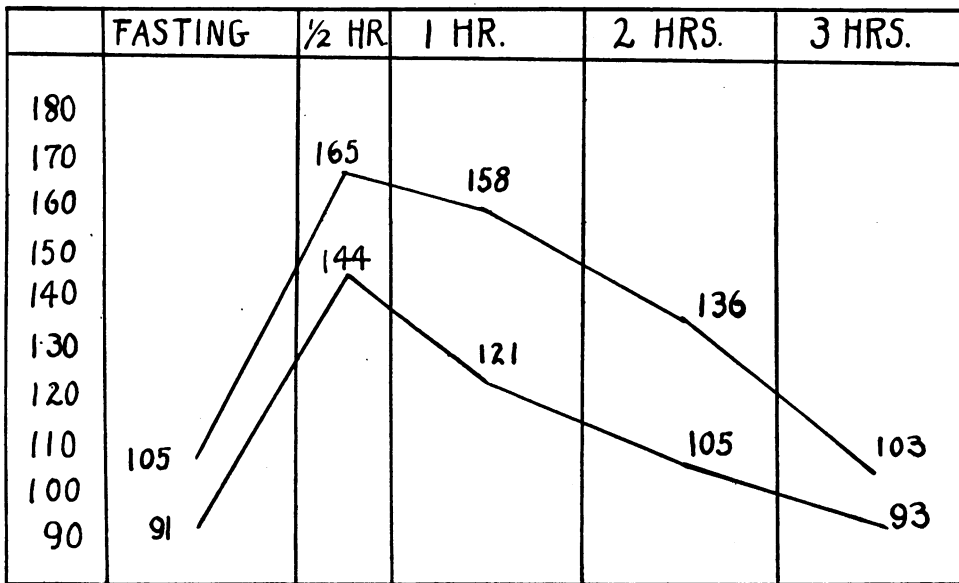
A striking difference is noted in the fasting blood-sugar determinations in this series of thirty-six cases of typical eczema, as contrasted with McGlasson's series of 158 cases of miscellaneous disorders, mostly of an eczematous type. In McGlasson's series, 87.9 per cent gave fasting blood-sugar values of 120 mgs. or more per 100 cc. of blood, in contrast with only 8.3 per cent in this series. It is possible that the study of more cases will raise the average fasting values.

A detailed study of the tolerance curves, however, confirms the impression given by McGlasson's work: namely, many cases of eczema are associated with a disturbance of carbohydrate metabolism. As a basis for comparison of these glucose tolerance reactions in eczema, a large series of tests in clinically normal individuals, recently reported by Horace Gray, was used. These control determinations were collected from recent literature, and represent results obtained according to various standard technics. Of these normal controls, 276 fasting blood-sugar tests were made—158 at the end of one-half hour, 300 at the end of one hour, 253 at the end of two hours, and 103 at the end of three hours. Of the thirty-six eczema cases, thirty were tested at all five intervals, and six were tested only at the fasting—one hour and two-hour periods.

Figure 1 illustrates the sharp contrast between the average curve of the thirty patients who were tested at all five periods, and the average curve of the clinically normal controls. If the six eczema cases who were not tested at the one-half and three-hour periods were included, the contrast would be even more marked, because the average value of these six patients at the end of the first hour was 240.8 mgs. per 100 cc. The one-half-hour period probably would have shown an even higher reading.

Some of the curves in patients with typical eczema coincided with the average normal. Many of the curves showed values of 200 or more even at the end of the second hour, the normal being 105 (Gray's series). The patient showing the greatest abnormality was a man 21 years old who had a papular eczema of the face, neck, and arms of three months' duration. His fasting blood sugar was 219.7, at one-half hour it was 235.5, at one hour 317.4, at two hours 303, at three hours 200. In this case the urine was negative for sugar throughout, although many of the eczema cases showed glycosuria at the first, second, or third hour. One patient who had what was supposed to be an occupational

FIGURE 1. Average curve of thirty eczema cases which were tested at all five periods (upper line) in contrast with average curve of normal cases.



eczema of the hands from soap and water showed 0.9 per cent of sugar in the urine at both the one and two-hour periods, and a blood sugar of 108 fasting, 296 at one hour, and 182 at two hours. Although he made very little progress under local treatment alone, the condition entirely cleared up when he was placed on a low carbohydrate diet.

Of the thirty cases tested at all five periods, the peak of the curve was reached at the one-half-hour period in 53 per cent, at the one-hour period in 36.6 per cent, and at the two-hour-period in 6.6 per cent. Thus, there is a tendency not only to develop a higher peak in eczema, but a delayed rise and also a delayed return to normal. Of these thirty cases which were tested at the three-hour period, only 56 per cent had returned to 100 mgs. or below, the average of the controls being 93.9 mgs.

The high percentage of cases in the entire series of thirty-six eczema cases showing unusually high values at the one and two-hour periods is shown in Figure 2. The fact that 16.6 per cent of the eczema series showed values of 200 or more at the end of two hours, while only 0.8 per cent of the control series showed such value, is one of the most striking evidences of a disturbance in the carbohydrate metabolism in at least some cases of eczema.

The interpretation of these findings must be approached with the utmost caution, since the series is not large enough to permit sweeping deductions. Nor has the investigation been under way long enough to permit adequate observation of the therapeutic benefits resulting from a low carbohydrate diet. In a few instances where the patients have remained under observation the results have been highly gratifying; this accords with McGlasson's observations. Repetition of the tests following a period of low carbohydrate diet would be of value in determining the ability of the patient to recover his tolerance for sugar. Whether the decreased carbohydrate tolerance, which occurs in many cases of eczema, is due to some underlying endocrine disturbance or to functional overstrain of the pancreas

from excessive carbohydrate intake is a question for further investigation to decide. A history of an excessive use of sugar or starch is not always obtainable.

It must be emphasized that some cases of typical eczema show perfectly normal sugar tolerance curves. It must be clearly understood that a decreased sugar tolerance is not being urged as the cause of eczema. Subsequent investigation may show that the decreased tolerance per se is the cause of some cases of eczema, and that it is only an incidental symptom of some more fundamental cause in other cases. Protein sensitization is still an important factor to be reckoned with in many cases of eczema, especially in infants. One patient in this series, a boy 12 years old, showed a definitely decreased tolerance, and also gave strongly positive cutaneous reactions to five of the common food allergens among the grains, fruits, and vegetables. Another patient, a man aged 34, gave strongly positive reactions to several pollen and vegetable allergens, but showed a normal sugar tolerance curve.

SUMMARY

1. A preliminary report is presented, dealing with the glucose tolerance reactions in a series of thirty-six consecutive cases of typical eczema.
2. The tests were made in two laboratories, each using the Folin-Wu colorimetric technic.
3. The fasting blood-sugar values in these cases of eczema were not found to be abnormally high, except in a few cases.
4. Very striking deviations from normal were found, however, at the one and two-hour periods, following the administration of the test glucose solution. Of the thirty-six eczema cases, 33.3 per cent showed 200 mgs. or more of glucose per 100 cc. of blood at the end of one hour, in contrast with only 5.6 per cent of 300 normal controls; and 16.6 per cent of the eczema cases showed 200 mgs. or

FIGURE 2. Percentage of abnormal readings.

	FASTING	1 HOUR	2 HOURS
	Per cent of cases	Per cent of cases	Per cent of cases
Mgs. per 100 cc.	120 or above	200 or above	200 or above
NORMAL	7.9% 276 cases	5.6% 300 cases	0.8% 253 cases
ECZEMA	8.3% 36 cases	33.6% 36 cases	16.6% 36 cases

more at the end of two hours, in contrast with only 0.8 per cent of 253 normal controls.

5. Of the thirty cases which were tested at the end of three hours, 40 per cent had not returned to a conservative estimate of normal (100 mgs.).

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DISCUSSION

OSCAR V. SCHROETER, M. D. (1002 Union Bank Building, Los Angeles)—Ayres' paper serves to accentuate the conclusion that eczema is only what dermatology and etiology prove it to be, a varying symptomatic manifestation; it is a cutaneous reaction. This reaction has, undoubtedly, a varying basis, due to the different pathologico-chemical state of the blood in different diseases and also to the particular degree of tolerance in various individuals to the same. This latter factor, only, can account for cases of poor sugar tolerance, which show no dermatological reaction. But the answer to the question, "Why does one individual with poor sugar tolerance have eczema and the other not?" is a deeper and more difficult problem of greater value. Various chronic diseases and disorders of metabolism produce eczema. Doctor Ayres has, very accurately, shown one. The therapeutic problem of dermatologists, in the face of an eczema, is to learn the particular basis of the same and treat it, as well as the skin condition locally.

KENDAL P. FROST, M. D. (Pacific Mutual Building, Los Angeles)—We are indebted to Doctor Ayres for elaboration on McGlasson's primary work in this field. I believe that the sugar level is not the only way in which these patients show themselves chemically. I feel that many patients who fall in this group are not entirely expressed in terms of carbohydrate, but that there is a protein element as well. This has been shown by Lorena M. Breed of Pasadena, whose results were published in a large series of cases not primary eczemas, but many of her cases had both disordered protein and carbohydrate metabolism of a type which seemed to point to liver disturbance. This group has recently been brought to our notice and promises to become an important one.

The picture of eczema and dermatitis is so complex that we are always grateful to anyone who is able to throw more light on the subject. Personally, I prefer to follow the French terminology and speak of "the eczemas" rather than in the singular term "eczema."

LORENA M. BREED, M. D. (Pasadena Hospital, Pasadena)—Doctor Ayres has emphasized one constituent only of the blood, blood sugar, in his study of eczema. It might be interesting, and instructive as well, to study the complete blood chemistry in these cases, and also to ascertain in what classes of cases one finds an elevation of fasting blood sugar.

In his work on protein therapy and the non-specific reactions, Petersen reports a constant elevation of blood sugar during the period of anaphylaxis.

The fasting blood sugar is very often elevated in people with a normal sugar tolerance because of a slight acidosis during even the short fasting period between the evening meal and breakfast. In these cases a carbohydrate meal or a dose of glucose will relieve the slight acidosis and the sugar level will return to normal. We often find, during a glucose-tolerance test, a fasting blood sugar level of 200 mgs. or over, and one hour after the per body weight dose of glucose, that it is lowered to 100 mg., instead of being elevated.

Fasting blood sugar is almost always high in lowered liver function, especially in cholecystitis. Only last week

we were called upon to do a blood chemistry for a patient who was awaiting an operation for gall-bladder disease. The blood sugar was 250 mgs. and the surgeon hesitated. After two days on a pureed vegetable diet, the blood sugar was 240 mgs. and the operation was performed. The gall-bladder was thickened and contained stones.

In a study of 250 cases on whom functional tests were done, together with complete blood chemistry on each, high values for blood sugar and uric acid, as well as N. P. N., were constantly found in those cases with clinical evidence of cholecystitis. Of this number twenty were operated and we had the opportunity of seeing, not only the pathological gall-bladders, but that the blood sugar and uric acid returned to normal following the operation.

That an absorption of split-proteins, whether from the intestinal tract, or from some focus of infection, will produce a sensitization of body cells is a well known fact. When we remember that the liver is very closely associated with the perfect digestion of proteins, that it stores sugar, and that one of its most important functions is that of detoxication, it becomes evident that this organ and its various functions must be reckoned with in any case of protein-sensitization, whether manifested on the skin, as in the eczemas, or on the mucous membrane of the respiratory tract. As the histology of the skin and the mucous membrane is the same, we may have eczema in one person, hay-fever in another and asthma in still another, or all three affections in the same person from the same cause.

GEORGE PINESS, M. D. (1136 West Sixth Street, Los Angeles)—From observation of Ayres' charts, I am inclined to believe that most of the cases presented here have an endocrine disturbance associated with their eczema, either having a definite relationship toward eczema or by being simply coincidental. I feel that if the series of patients studied by Ayres were tested to proteins, and by that I mean just at the proper time with properly prepared proteins, a great many of them would give definite reactions. It is an accepted fact that eczema is an allergic reaction and, as shown by the work of Petersen, blood sugars are constantly elevated during anaphylactic periods. Therefore, I contend that probably the cases discussed by the writer are of protein sensitive type and that the blood sugar tolerance tests are not an etiological factor.

H. P. JACOBSON, M. D. (424 South Broadway, Los Angeles)—Doctor Ayres' venture into the study of relationships between eczema and metabolism will serve a two-fold purpose of emphasizing anew the futility of attempting to treat these cases purely as local conditions, and will, no doubt, serve to stimulate others to further study of the problem from the standpoint of etiology.

His observation of an impaired glucose tolerance in patients suffering from eczema represents only one factor in a complex problem, the solution of which is, as yet, incomplete. It is my impression that the abnormal glucose curve in these patients is significant of a type of alimentary hyper-glycemia due to a hepatic deficiency and an inability on the part of the liver to convert glucose into glycogen in normal quantities. These patients almost invariably complain of a chain of digestive symptoms referable to the gastro-hepatic tract, thus lending weight to the presumption that the reason for the abnormal glucose curve in the blood is to be found in the liver.

The nature of the particular hepatic lesion in any given case, of course, varies. In some, it may simply consist of an exhaustion of the organ, brought about by an over-indulgence of carbohydrates and thereby overtaxing the functional capacity of the liver. In others the exhaustive state may be brought about by a focal infection in some remote part of the body or in the immediate neighborhood of the gall tract, surcharging the portal circulation with bacterial toxins and thereby making a consequent extra heavy demand upon the liver and upon its detoxicating function. (The liver is one of the chief detoxicating organs in the economy.) Or, as a result of a generalized degenerative process in the vascular, cardiac or renal system, the liver becomes involved, in which event, not only will there be found an impaired glucose

curve, but the values of the products of the protein metabolism generally will be found altered.

In other words, the fairly constant impaired glucose curve, observed in cases of eczema by Doctor Ayres, should be interpreted in the light of a symptom only, the cause of which must be sought for in every case to enable us to proceed with judicious treatment. That, in turn, implies a comprehensive knowledge of, and skill in, the theory and practice of internal medicine.

DOCTOR AYRES (closing)—I appreciate very much the generous remarks and the valuable suggestions which have been offered in the foregoing discussions. I have merely tried to call attention to the role of the carbohydrates in the problem of eczema.

Carbohydrate metabolism, on the other hand, is intimately linked with other vital functions upon which detailed observation and research must be focussed before the riddle can be solved.

With all due respect to the splendid work which Piness has done in the field of allergic phenomena, I cannot subscribe unreservedly to his statement that "it is an accepted fact that eczema is an allergic reaction."

Some eczemas are allergic reactions, just as some headaches may be allergic reactions, but it would be inadvisable to admit of no other causes. The eczemas on the hands of dishwashers and the eczemas due to various other external irritants are certainly not of the protein sensitive type. On the other hand it would seem quite reasonable that there may be an associated disturbance of both protein and carbohydrate metabolism in some of the eczemas. I would be the last to say that many of my cases did not fall in this category. But, again, I do not believe it has been proved that protein sensitization is an ultimate cause. Certain facts point to allergic reactions as symptoms of more fundamental disturbances, just as in the case of decreased carbohydrate tolerance, and the real solution of the problem lies in the discovery and correction of that primary disorder. Breed's observation on liver function seem to me to offer extremely interesting possibilities.

Again let me emphasize the fact that I am not urging carbohydrate intolerance as the cause of all eczemas; it is only a small but very important factor.

Oxygen Want in Health and Disease—Charles W. Greene, Columbia, Mo. (Journal A. M. A.), discusses the oxygen capacity of the blood; normal alveolar oxygen pressures; the physiology of high alveolar oxygen pressures; the physiology of low alveolar oxygen pressures; the anoxemic crisis; the significance and danger of the asphyxial post-crisis events; the remedy for anoxemia—an artificial oxygen supply; oxygen want in anesthesia; oxygen availability in disease; the oxygen problem in cardiac deficits, and the anemias. He concludes that the administration of oxygen has no advantage to the normal body. Airs of more than 60 per cent of oxygen may produce pulmonary inflammation by local action. Oxygen administration has no physiologic clinical advantage in hemorrhage, anemia, or other circulatory mechanical defects. Oxygen-enriched airs are of life-saving value in all clinical cases of pulmonary obstruction, edemas or other deficiencies that retard the process of oxygen absorption or prevent the full saturation of the hemoglobin of the pulmonary blood. Oxygen administration must be controlled by recognized physiologic methods, must be continual, and must not produce local pulmonary injury. Oxygen administration cannot be successfully pursued except with clear understanding of the type of response to anoxemia and the recoveries on re-oxygenation through the complex and interdependent reactions of the nervous system, the respiratory system, the circulatory system, and the blood. For all these we have in present-day methods and animal verification an accurate scientific basis of determination.

A doctor's widow is looking for a job because her husband lost his savings in a malpractice suit just before he died. Whatever else you do, doctor, protect your wife and children from disasters inherent in the hazards of your profession.

THE USE OF WHOLE LACTIC ACID MILK IN PRIVATE PRACTICE

By JAMES W. CHAPMAN, M. D., Pasadena

Lactic acid milk changes the bacterial flora of the intestine only to a slight extent and this change is not essential for its beneficial action.

Milk, soured by addition of U. S. P. Lactic Acid in the proper amount, seems to have an effect practically the same as that soured by organisms.

The chief advantage of whole lactic acid milk lies in the fact that it is a concentrated food and can be fed to athreptic infants and other below-weight infants, whose tolerance for fat and sugar has been lowered, in sufficient amounts to bring about a gain without causing an intestinal disturbance.

Whole lactic acid milk is not a panacea. I do not believe its use is indicated in normal infants. We have found it to be of greatest value in the feeding of the so-called athreptic infant, although, in some intestinal upsets, its value is unquestioned.

DISCUSSION by T. C. McCleave, Oakland; Paul S. Barrett, Fresno.

NO NEW facts are presented in this paper. It was written because we thought it might be of more or less general interest to relate some experiences with the use of whole lactic acid milk in private practice, where conditions are vastly different from those found in hospitals and institutions where most of the work with soured milk formulae has been done.

At the outset it might be of some interest to describe briefly the historical background of soured milk and its use as an article of diet. It has been used extensively among all peoples and in all climes for untold centuries. As a food for infants and invalids it has been used by the Armenians and other Near Eastern peoples quite as long as the well-known matzoon.

Metchnikoff attributed the sturdy health and longevity of certain of the Balkan peoples to their extensive use of soured milk as food. His observations and investigations gave a tremendous impetus to the use of soured milk and to the souring agency, the so-called *B. bulgaricus*. Metchnikoff attributed the beneficial result following the use of sour milk to the organisms souring the milk, stating that they brought about a change in the bacterial flora of the intestine. For many years soured milk and the various organisms capable of souring milk were given for no other purpose than to bring about a change in the bacterial flora of the intestine. Beneficial results were explained on such a basis. First, *B. bulgaricus* held the limelight and Bulgarian tablets were prescribed at the least provocation; later, *B. lactic acid* and *B. acidophilus* became the organisms of choice for one reason or another, based on not very convincing experimental work.

That there seemed at first glance very good reason to suspect intestinal bacteria of causing many of the diarrheas of infancy and childhood, may be seen when stools are examined during an intestinal upset. Often pure cultures of one organism are found, the commonest perhaps being *B. coli*, *B. welchii*, *streptococcus faecalis*, *B. pyococcyaneus*, and *B. proteus*, and to each one at some time or other has been ascribed the causation of diarrheas in infants.

The result of most of the work done in recent years on the subject of the role of bacteria in the